



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

PROCEEDINGS
OF THE
NATIONAL ACADEMY
OF SCIENCES

OF THE UNITED STATES OF AMERICA

VOLUME 4, 1918



EDITORIAL BOARD

RAYMOND PEARL, *Chairman*

EDWIN B. WILSON, *Managing Editor*

ARTHUR L. DAY, *Home Secretary*

GEORGE E. HALE, *Foreign Secretary*

J. J. ABEL

J. P. IDDINGS

E. H. MOORE

J. M. CLARKE

JACQUES LOEB

A. A. NOYES

H. H. DONALDSON

GRAHAM LUSK

ALEXANDER SMITH

E. B. FROST

A. G. MAYOR

E. L. THORNDIKE

R. A. HARPER

R. A. MILLIKAN

W. M. WHEELER

Publication Office: Williams & Wilkins Company, Baltimore
Editorial Office: Massachusetts Institute of Technology, Cambridge

Home Office of the Academy: Washington, D. C.

CONTENTS

	PAGE
OFFICERS AND MEMBERS OF THE ACADEMY.....	vii
NOTICES OF BIOGRAPHICAL MEMOIRS.....	54
REPORT OF THE ANNUAL MEETING, APRIL, 1918.....	261
AWARD OF MEDALS.....	273
RESEARCH GRANTS FROM THE TRUST FUNDS OF THE ACADEMY.....	273
INDEX.....	419

NATIONAL RESEARCH COUNCIL

REPORT OF THE COMMITTEE ON ANTHROPOLOGY.....	52
MEETINGS OF THE EXECUTIVE COMMITTEE.....	76
MINUTES OF EXECUTIVE BOARD OF WAR ORGANIZATION.....	122
EXECUTIVE ORDER ISSUED BY THE PRESIDENT OF THE UNITED STATES, MAY 11, 1918..	251
MINUTES OF THE SECOND MEETING OF THE EXECUTIVE BOARD OF THE WAR ORGANIZATION IN JOINT SESSION WITH THE COUNCIL OF THE NATIONAL ACADEMY OF SCIENCES.....	252
MINUTES OF THIRD MEETING OF EXECUTIVE BOARD OF WAR ORGANIZATION.....	256
MINUTES OF THE MEETING OF THE EXECUTIVE BOARD.....	397, 405
MINUTES OF JOINT MEETING OF THE EXECUTIVE BOARD AND THE COUNCIL OF THE NATIONAL ACADEMY OF SCIENCES.....	410
MINUTES OF THE MEETING OF THE EXECUTIVE BOARD.....	414

MATHEMATICS

INVARIANTS WHICH ARE FUNCTIONS OF PARAMETERS OF THE TRANSFORMATION	By <i>Oliver E. Glenn</i> 145
ON THE REPRESENTATION OF A NUMBER AS THE SUM OF ANY NUMBER OF SQUARES AND IN PARTICULAR OF FIVE OR SEVEN.....	By <i>G. H. Hardy</i> 189
ARITHMETICAL THEORY OF CERTAIN HURWITZIAN CONTINUED FRACTIONS	By <i>D. N. Lehmer</i> 214
ON CLOSED CURVES DESCRIBED BY A SPHERICAL PENDULUM.....	By <i>Arnold Emch</i> 218
ON THE α -HOLOMORPHISMS OF A GROUP.....	By <i>G. A. Miller</i> 293
INVARIANTS AND CANONICAL FORMS.....	By <i>E. J. Wilczynski</i> 300
ON CERTAIN PROJECTIVE GENERALIZATIONS OF METRIC THEOREMS, AND THE CURVES OF DARBOUX AND SEGRE.....	By <i>Gabriel M. Green</i> 346
ON JACOBI'S EXTENSION OF THE CONTINUED FRACTION ALGORITHM..	By <i>D. N. Lehmer</i> 360
A CHARACTERIZATION OF JORDAN REGIONS BY PROPERTIES HAVING NO REFERENCE TO THEIR BOUNDARIES.....	By <i>Robert L. Moore</i> 364

ASTRONOMY

THE LOCATION OF THE SUN'S MAGNETIC AXIS	By <i>F. H. Seares, A. van Maanen, and F. Ellerman</i> 4
THE ROTATION AND RADIAL VELOCITY OF THE CENTRAL PART OF THE ANDROMEDA NEBULA.....	By <i>F. G. Pease</i> 21
A DETERMINATION OF THE SOLAR MOTION AND THE STREAM MOTION BASED ON RADIAL VELOCITIES AND ABSOLUTE MAGNITUDES.....	By <i>Gustaf Strömberg</i> 36
DEPENDENCE OF THE SPECTRAL RELATION OF DOUBLE STARS UPON DISTANCE	By <i>C. D. Perrine</i> 71

HYPOTHESIS TO ACCOUNT FOR THE SPECTRAL CONDITIONS OF THE STARS	
	<i>By C. D. Perrine</i> 75
SOME SPECTRAL CHARACTERISTICS OF CEPHEID VARIABLES	
	<i>By W. S. Adams and A. H. Joy</i> 129
A STUDY OF THE MOTIONS OF FORTY-EIGHT DOUBLE STARS.....	<i>By Eric Doolittle</i> 137
STUDIES OF MAGNITUDES IN STAR CLUSTERS, VIII. A SUMMARY OF RESULTS BEARING	
ON THE STRUCTURE OF THE SIDEREAL UNIVERSE.....	<i>By Harlow Shapley</i> 224
THE SMITHSONIAN 'SOLAR CONSTANT' EXPEDITION TO CALAMA, CHILE..	<i>By C. G. Abbot</i> 313
THE ABSORPTION SPECTRUM OF THE NOVAE.....	<i>By W. S. Adams</i> 354
THE DISTANCES OF SIX PLANETARY NEBULAE.....	<i>By Adriaan van Maanen</i> 394

PHYSICS AND ENGINEERING

RESONANCE AND IONIZATION POTENTIALS FOR ELECTRONS IN CADMIUM, ZINC, AND	
POTASSIUM VAPORS.....	<i>By John T. Tate and Paul D. Foote</i> 9
THE VALIDITY OF THE EQUATION $P = T dv/dT$ IN THERMO-ELECTRICITY	
	<i>By Edwin H. Hall</i> 11
ON THE EQUATIONS OF THE RECTANGULAR INTERFEROMETER.....	<i>By Carl Barus</i> 13
THERMO-ELECTRIC DIAGRAMS ON THE P-V-PLANE.....	<i>By Edwin H. Hall</i> 29
IS A MOVING STAR RETARDED BY THE REACTION OF ITS OWN RADIATION?	
	<i>By Leigh Page</i> 47
ON ELECTROMAGNETIC INDUCTION AND RELATIVE MOTION. II.....	<i>By S. J. Barnett</i> 49
THE RESOLVING POWERS OF X-RAY SPECTROMETERS AND THE TUNGSTEN X-RAY	
SPECTRUM.....	<i>By Elmer Dershem</i> 62
NOTE ON METHODS OF OBSERVING POTENTIAL DIFFERENCES INDUCED BY THE EARTH'S	
MAGNETIC FIELD IN AN INSULATED MOVING WIRE	
	<i>By Carl Barus and Maxwell Barus</i> 66
MOBILITIES OF IONS IN AIR, HYDROGEN, AND NITROGEN.....	<i>By Kia-Lok Yen</i> 91
THERMO-ELECTRIC ACTION WITH DUAL CONDUCTION OF ELECTRICITY	
	<i>By Edwin H. Hall</i> 98
TERRESTRIAL TEMPERATURE AND ATMOSPHERIC ABSORPTION.....	<i>By C. G. Abbot</i> 104
MOBILITIES OF IONS IN VAPORS.....	<i>By Kia-Lok Yen</i> 106
TYPES OF ACHROMATIC FRINGES.....	<i>By Carl Barus</i> 132
INTERFERENCE OF PENCILS WHICH CONSTITUTE THE REMOTE DIVERGENCES FROM A	
SLIT.....	<i>By Carl Barus</i> 134
THE STRUCTURE OF AN ELECTROMAGNETIC FIELD.....	<i>By H. Bateman</i> 140
THE CRYSTAL STRUCTURE OF ICE.....	<i>By Ancel St. John</i> 193
ON THE CORRECTION OF OPTICAL SURFACES.....	<i>By A. A. Michelson</i> 210
THE DEPTH OF THE EFFECTIVE PLANE IN X-RAY CRYSTAL PENETRATION	
	<i>By F. C. Blake</i> 236
THERMO-ELECTRIC ACTION WITH THERMAL EFFUSION IN METALS: A CORRECTION	
	<i>By Edwin H. Hall</i> 297
TYPES OF PHOSPHORESCENCE.....	<i>By Edward L. Nichols and H. L. Howes</i> 305
THE INTERFEROMETRY OF VIBRATING SYSTEMS.....	<i>By Carl Barus</i> 328
ON THE ESSENCE OF PHYSICAL RELATIVITY.....	<i>By Sir Joseph Larmor</i> 334
GRAVITATIONAL ATTRACTION IN CONNECTION WITH THE RECTANGULAR INTERFEROMETER	
	<i>By Carl Barus</i> 338
THE GENERAL CHARACTER OF SPECIFIC HEATS AT HIGH TEMPERATURES	
	<i>By Waller P. White</i> 343
THE RECTANGULAR INTERFEROMETER WITH ACHROMATIC DISPLACEMENT FRINGES IN	
CONNECTION WITH THE HORIZONTAL PENDULUM.....	<i>By Carl Barus</i> 349

CONTENTS

v

CHEMISTRY

THE HEAT CAPACITY OF ELECTRO-POSITIVE METALS AND THE THERMAL ENERGY OF FREE ELECTRONS.....	By Gilbert N. Lewis, E. D. Eastman and W. H. Rodebush 25
NOTES ON ISOTOPIC LEAD.....	By Frank Wigglesworth Clarke 181
REFRACTIVE INDEX AND SOLUBILITIES OF THE NITRATES OF LEAD ISOTOPES	By Theodore W. Richards and Walter C. Schumb 386
THE PURIFICATION BY SUBLIMATION AND THE ANALYSIS OF GALLIUM CHLORIDE	By Theodore W. Richards, W. M. Craig, and J. Sameshima 387
THE PURIFICATION OF GALLIUM BY ELECTROLYSIS, AND THE COMPRESSIBILITY AND DENSITY OF GALLIUM.....	By Theodore W. Richards and Sylvester Boyer 388

GEOLOGY AND PALEONTOLOGY

THE STUDY OF THE SEDIMENTS AS AN AID TO THE EARTH HISTORIAN	By Eliot Blackwelder 163
FRINGING REEFS OF THE PHILIPPINE ISLANDS.....	By W. M. Davis 197
GLACIAL DEPRESSION AND POST-GLACIAL UPLIFT OF NORTHEASTERN AMERICA	By H. L. Fairchild 229
METALLIFEROUS LATERITE IN NEW CALEDONIA.....	By W. M. Davis 275
THE IMPORTANCE OF NIVATION AS AN EROSIVE FACTOR, AND OF SOIL FLOW AS A TRANSPORTING AGENCY, IN NORTHERN GREENLAND.....	By W. Elmer Ekblaw 288
THE PHYLOGENY OF THE ACORN BARNACLES.....	By Rudolf Ruedemann 382
POSSIBLE DERIVATION OF THE LEPADID BARNACLES FROM THE PHYLLPODS	By John M. Clarke 384

MINERALOGY AND PETROLOGY

A CONTRIBUTION TO THE PETROGRAPHY OF THE SOUTH SEA ISLANDS	By J. P. Iddings and E. W. Morley 110
TESTS FOR FLUORINE AND TIN IN METEORITES WITH NOTES ON MASKELYNITE AND THE EFFECT OF DRY HEAT ON METEORIC STONES.....	By George P. Merrill 176

BOTANY

DYNAMICAL ASPECTS OF PHOTOSYNTHESIS.....	By W. J. V. Osterhout and A. R. C. Haas 85
THE TAXONOMIC POSITION OF THE GENUS ACTINOMYCES.....	By Charles Drechsler 221
A BACTERIOLOGICAL STUDY OF THE SOIL OF LOGGERHEAD KEY, TORTUGAS, FLORIDA	By C. B. Lipman and D. D. Waynick 232

ZOOLOGY

THE REACTIONS OF THE MELANOPHORES OF AMIURUS TO LIGHT AND TO ADRENALIN	By A. W. L. Bray 58
FURTHER EXPERIMENTS ON THE SEX OF PARTHENOGENETIC FROGS..	By Jacques Loeb 60
POSSIBLE ACTION OF THE SEX-DETERMINING MECHANISM.....	By C. E. McClung 160
THE GROWTH OF THE ALASKAN FUR SEAL HERD BETWEEN 1912 AND 1917	By G. H. Parker 168
AUTONOMOUS RESPONSES OF THE LABIAL PALPS OF ANODONTA.....	By P. H. Cobb 234
THE MYODOME AND TRIGEMINO-FACIALIS CHAMBER OF FISHES AND THE CORRESPONDING CAVITIES IN HIGHER VERTEBRATES.....	By Edward Phelps Allis, Jr. 241
VARIATION AND HEREDITY DURING THE VEGETATIVE REPRODUCTION OF ARCELLA DENTATA.....	By R. W. Hegner 283

THE 'HOMING HABITS' OF THE PULMONATE MOLLUSK ONCHIDIUM	
	<i>By Leslie B. Arey and W. J. Crozier</i> 319
GROWTH AND DURATION OF LIFE OF CHITON TUBERCULATUS.....	<i>By W. J. Crozier</i> 322
GROWTH OF CHITON TUBERCULATUS IN DIFFERENT ENVIRONMENTS..	<i>By W. J. Crozier</i> 325
ON THE METHOD OF PROGRESSION IN POLYCLADS.....	<i>By W. J. Crozier</i> 379
THE GROWTH-RATE OF SAMOAN CORAL REEFS.....	<i>By Alfred G. Mayor</i> 390

GENETICS

DISEASE RESISTANCE IN CABBAGE.....	<i>By L. R. Jones</i> 42
THE EFFECT OF ARTIFICIAL SELECTION ON BRISTLE NUMBER IN DROSOPHILA AMPELOPHILA AND ITS INTERPRETATION.....	<i>By Fernandus Payne</i> 55
HEREDITARY TENDENCY TO FORM NERVE TUMORS.....	<i>By C. B. Davenport</i> 213
THE EFFECT OF INBREEDING AND CROSSBREEDING UPON DEVELOPMENT	
	<i>By D. F. Jones</i> 246
MAROON—A RECURRENT MUTATION IN DROSOPHILA.....	<i>By Calvin B. Bridges</i> 316
SEX AND SEX INTERGRADES IN CLADOCERA.....	<i>By Authur M. Banta</i> 373

PHYSIOLOGY AND PATHOLOGY

THE BASAL KATABOLISM OF CATTLE AND OTHER SPECIES	
	<i>By Henry Prentiss Armsby, J. August Fries and Winfred Waite Braman</i> 1
THE BRAIN WEIGHT IN RELATION TO THE BODY LENGTH AND ALSO THE PARTITION OF NON-PROTEIN NITROGEN, IN THE BRAIN OF THE GRAY SNAPPER (NEOMAENIS GRISEUS).....	<i>By Shinkishi Hatai</i> 19
THE LAW CONTROLLING THE QUANTITY AND RATE OF REGENERATION	
	<i>By Jacques Loeb</i> 117
EFFECTS OF A PROLONGED REDUCTION IN DIET ON 25 MEN. I. INFLUENCE ON BASAL METABOLISM AND NITROGEN EXCRETION.....	<i>By Francis G. Benedict and Paul Roth</i> 149
EFFECTS OF A PROLONGED REDUCTION IN DIET ON 25 MEN. II. BEARING ON NEUROMUSCULAR PROCESSES AND MENTAL CONDITION.....	<i>By Waller R. Miles</i> 152
EFFECTS OF A PROLONGED REDUCTION IN DIET ON 25 MEN. III. INFLUENCE ON EFFICIENCY DURING MUSCULAR WORK.....	<i>By H. Monmouth Smith</i> 157
THE DESTRUCTION OF TETANUS ANTITOXIN BY CHEMICAL AGENTS	
	<i>By W. N. Berg and R. A. Kelser</i> 174
DILATION OF THE GREAT ARTERIES DISTAL TO PARTIALLY OCCLUDING BANDS	
	<i>By William S. Halsted</i> 204
A COMPARISON OF GROWTH CHANGES IN THE NERVOUS SYSTEM OF THE RAT WITH CORRESPONDING CHANGES IN THE NERVOUS SYSTEM OF MAN	
	<i>By Henry H. Donaldson</i> 280
A BIOMETRIC STUDY OF HUMAN BASAL METABOLISM	
	<i>By J. Arthur Harris and Francis G. Benedict</i> 370

ANTHROPOLOGY AND PSYCHOLOGY

MEASURING THE MENTAL STRENGTH OF AN ARMY.....	<i>By Major Robert M. Yerkes</i> 295
---	--------------------------------------

OFFICERS AND MEMBERS OF THE ACADEMY

NOVEMBER 20, 1918

OFFICERS OF THE ACADEMY

CHARLES D. WALCOTT, *President*
 A. A. MICHELSON, *Vice-President* GEORGE E. HALE, *Foreign Secretary*
 WHITMAN CROSS, *Treasurer* C. G. ABBOT, *Acting Home Secretary*

Additional Members of the Council

W. H. HOWELL E. G. CONKLIN R. H. CHITTENDEN
 C. G. ABBOT A. A. NOYES M. I. PUPIN

MEMBERS OF THE ACADEMY

ABBOT, CHARLES GREELEY.....*Smithsonian Institution, Washington, D. C.*
 ABBOT, HENRY L., U. S. A.....*23 Berkeley St., Cambridge, Mass.*
 ABEL, JOHN JACOB.....*Johns Hopkins University, Baltimore, Md.*
 ADAMS, WALTER SYDNEY.....*Solar Observatory Office, Pasadena, Cal.*
 AITKEN, ROBERT GRANT.....*Lick Observatory, Mount Hamilton, Cal.*
 ALLEN, J. ASAPH.....*American Museum of Natural History, New York City.*
 AMES, JOSEPH S.....*Johns Hopkins University, Baltimore, Md.*
 ATKINSON, GEORGE FRANCIS.....*Cornell University, Ithaca, N. Y.*
 BAILEY, LIBERTY HYDE.....*Cornell University, Ithaca, N. Y.*
 BARNARD, E. E.....*Yerkes Observatory, Williams Bay, Wis.*
 BARUS, CARL.....*Brown University, Providence, R. I.*
 BAXTER, GREGORY PAUL.....*T. J. Coolidge, Jr. Mem. Lab., Cambridge, Mass.*
 BECKER, GEORGE F.....*U. S. Geological Survey, Washington, D. C.*
 BELL, A. GRAHAM.....*1331 Connecticut Ave., Washington, D. C.*
 BENEDICT, FRANCIS GANO.....*Nutrition Laboratory, Boston, Mass.*
 BIRKHOFF, GEORGE DAVID.....*Harvard University, Cambridge, Mass.*
 BLISS, GILBERT AMES.....*University of Chicago, Chicago, Ill.*
 BOAS, FRANZ.....*Columbia University, New York City.*
 BOGERT, MARSTON TAYLOR.....*Columbia University, New York City.*
 BOLTWOOD, B. B.....*Yale University, New Haven, Conn.*
 BOLZA, OSKAR.....*Reichsgrafenstr. 10, Freiburg, Germany.*
 BRANNER, JOHN C.....*Stanford University, California.*
 BRIDGMAN PERCY WILLIAMS.....*Harvard University, Cambridge, Mass.*
 BRITTON, NATHANIEL LORD.....*New York Botanical Gardens, New York City.*
 BUMSTEAD, HENRY ANDREWS.....*Yale University, New Haven, Conn.*
 CAMPBELL, D. H.....*Stanford University, California.*
 CAMPBELL, WILLIAM W.....*Lick Observatory, Mount Hamilton, California.*
 CANNON, WALTER BRADFORD.....*Harvard University, Cambridge, Mass.*
 CARTY, JOHN J.....*Am. Telegraph and Telephone Co., N. Y. City.*
 CASTLE, WILLIAM ERNEST.....*186 Payson Road, Belmont, Mass.*
 CATTELL, JAMES MCK.....*Garrison, N. Y.*
 CHAMBERLIN, THOMAS C.....*University of Chicago, Chicago, Ill.*
 CHANDLER, CHARLES F.....*Columbia University, New York City.*
 CHITTENDEN, RUSSELL H.....*Sheffield Scientific School, New Haven, Conn.*
 CLARKE, F. W.....*U. S. Geological Survey, Washington, D. C.*

CLARKE, J. M.	State Hall, Albany, N. Y.
COMSTOCK, GEORGE C.	Washburn Observatory, Madison, Wis.
CONKLIN, E. G.	Princeton, N. J.
COULTER, J. M.	University of Chicago, Chicago, Ill.
COUNCILMAN, WILLIAM T.	Harvard Medical School, Boston, Mass.
CREW, HENRY	Northwestern University, Evanston, Ill.
CROSS, WHITMAN	U. S. Geological Survey, Washington, D. C.
CUSHING, HARVEY	Harvard University, Cambridge, Mass.
DALL, WILLIAM H.	Smithsonian Institution, Washington, D. C.
DANA, EDWARD S.	Yale University, New Haven, Conn.
DAVENPORT, CHARLES B.	Cold Spring Harbor, N. Y.
DAVIS, WILLIAM MORRIS	31 Hawthorn St., Cambridge, Mass.
DAY, ARTHUR L.	Geophysical Laboratory, Washington, D. C.
DEWEY, JOHN	Columbia University, New York City
DICKSON, LEONARD E.	University of Chicago, Chicago, Ill.
DONALDSON, HENRY HERBERT	Wistar Institute of Anatomy, Philadelphia, Pa.
DURAND, WILLIAM FREDERICK	4227 4th St. and Missouri Avenue, Washington, D. C.
ELKIN, WILLIAM L.	Yale University Observatory, New Haven, Conn.
FARLOW, W. G.	Harvard University, Cambridge, Mass.
FEWKES, JESSE WALTER	Bureau of American Ethnology, Washington, D. C.
FLEXNER, SIMON	Rockefeller Institute, New York City
FOLIN, OTTO	Harvard Medical School, Boston, Mass.
FORBES, STEPHEN ALFRED	University of Illinois, Urbana, Ill.
FRANKLIN, EDWARD CURTIS	Stanford University, California
FREEMAN, JOHN RIPLEY	Providence, R. I.
FROST, EDWIN B.	Yerkes Observatory, Williams' Bay, Wis.
GOMBERG, MOSES	University of Michigan, Ann Arbor, Mich.
GOOCH, FRANK A.	Yale University, New Haven, Conn.
GOODALE, GEORGE L.	Harvard University, Cambridge, Mass.
HALE, GEORGE E.	Solar Observatory Office, Pasadena, Cal.
HALL, EDWIN H.	Harvard University, Cambridge, Mass.
HALL, GRANVILLE STANLEY	Clark University, Worcester, Mass.
HALSTED, WILLIAM STEWART	Johns Hopkins Medical School, Baltimore, Md.
HARPER, R. A.	Columbia University, New York City
HARRISON, ROSS G.	Yale University, New Haven, Conn.
HASTINGS, CHARLES S.	Yale University, New Haven, Conn.
HAYFORD, JOHN F.	Northwestern University, Evanston, Ill.
HEKTOEN, LUDVIG	University of Chicago, Chicago, Ill.
HERRICK, CHARLES JUDSON	University of Chicago, Chicago, Ill.
HILLEBRAND, WILLIAM F.	Bureau of Standards, Washington, D. C.
HOLMES, WILLIAM H.	U. S. National Museum, Washington, D. C.
HOWARD, LELAND OSSIAN	U. S. Dept. of Agriculture, Washington, D. C.
HOWE, HENRY MARION	Broad Brook Road, Bedford Hills, N. Y.
HOWELL, WILLIAM H.	Johns Hopkins University, Baltimore, Md.
IDDINGS, JOSEPH P.	U. S. Geological Survey, Washington, D. C.
JACKSON, CHARLES L.	6 Boylston Hall, Cambridge, Mass.
JENNINGS, HERBERT SPENCER	Johns Hopkins University, Baltimore, Md.
JEWETT, FRANK BALDWIN	Western Electric Co., New York, N. Y.
JONES, WALTER	Johns Hopkins University, Baltimore, Md.
KASNER, EDWARD	Columbia University, New York City
KEMP, JAMES F.	Columbia University, New York City
LANGMUIR, IRVING	General Electric Co., Schenectady, N. Y.

LEUSCHNER, ARMIN O.	University of California, Berkeley, Cal.
LEVENE, PHÆBUS AARON THEODOR.	Rockefeller Institute, New York City.
LEWIS, GILBERT N.	University of California, Berkeley, Cal.
LILLIE, FRANK RATTRAY.	University of Chicago, Chicago, Ill.
LINDGREN, WALDEMAR.	Massachusetts Institute of Technology, Cambridge, Mass.
LOEB, JACQUES.	Rockefeller Institute, New York City.
LUSK, GRAHAM.	Cornell University Medical College, New York City.
LYMAN, THEODORE.	Harvard University, Cambridge, Mass.
MARK, EDWARD L.	109 Irving St., Cambridge, Mass.
MAYOR, ALFRED GOLDSBOROUGH.	Carnegie Institution, Maplewood, N. J.
MELTZER, SAMUEL JAMES.	Rockefeller Institute, New York City.
MENDEL, LAFAYETTE B.	262 Canner St., New Haven, Conn.
MENDENHALL, CHARLES ELLWOOD.	University of Wisconsin, Madison, Wis.
MENDENHALL, THOMAS C.	329 North Chestnut St., Ravenna, Ohio.
MERRIAM, C. HART.	1919 16th St., Washington, D. C.
MERRIAM, JOHN CAMPBELL.	University of California, Berkeley, Cal.
MERRITT, ERNEST.	Cornell University, Ithaca, N. Y.
MICHAEL, ARTHUR.	219 Parker St., Newton Center, Mass.
MICHELSON, ALBERT A.	University of Chicago, Chicago, Ill.
MILLIKAN, ROBERT ANDREWS.	University of Chicago, Chicago, Ill.
MOORE, ELIAKIM H.	University of Chicago, Chicago, Ill.
MORGAN, T. H.	Columbia University, New York City.
MORLEY, EDWARD W.	West Hartford, Conn.
MORSE, EDWARD S.	Salem, Mass.
MORSE, HARMON N.	Johns Hopkins University, Baltimore, Md.
MOULTON, F. R.	University of Chicago, Chicago, Ill.
NICHOLS, EDWARD L.	Cornell University, Ithaca, N. Y.
NICHOLS, ERNEST F.	Yale University, New Haven, Conn.
NOYES, ARTHUR A.	Massachusetts Institute of Technology, Cambridge, Mass.
NOYES, WILLIAM A.	University of Illinois, Urbana, Ill.
OSBORN, H. F.	American Museum of Natural History, New York City.
OSBORNE, T. B.	Agricultural Experiment Station, New Haven, Conn.
OSGOOD, WILLIAM FOGG.	Harvard University, Cambridge, Mass.
PARKER, GEORGE H.	16 Berkeley St., Cambridge, Mass.
PEARL, RAYMOND.	Maine Agricultural Experiment Station, Orono, Me.
PICKERING, EDWARD C.	Harvard College Observatory, Cambridge, Mass.
PIRSSON, LOUIS V.	41 Trumbull St., New Haven, Conn.
PRUDDEN, T. MITCHELL.	Columbia University, New York City.
PUMPELLY, RAPHAEL.	Gibbs Ave., Newport, R. I.
PUPIN, MICHAEL I.	Columbia University, New York City.
RANSOME, FREDERICK LESLIE.	U. S. Geological Survey, Washington, D. C.
REID, H. FIELDING.	Johns Hopkins University, Baltimore, Md.
REMSEN, IRA.	Johns Hopkins University, Baltimore, Md.
RICHARDS, THEODORE W.	Wolcott Gibbs Memorial Laboratory, Cambridge, Mass.
RIDGWAY, ROBERT.	U. S. National Museum, Washington, D. C.
ROSA, EDWARD B.	Bureau of Standards, Washington, D. C.
RUSSELL, HENRY NORRIS.	Princeton University, Princeton, N. J.
SABINE, WALLACE C.	Harvard University, Cambridge, Mass.
SARGENT, CHARLES S.	Arnold Arboretum, Jamaica Plain, Mass.
SCHLESINGER, FRANK.	Allegheny Observatory, Allegheny, Pa.
SCHUCHERT, CHARLES.	Yale University, New Haven, Conn.
SCOTT, WILLIAM B.	Princeton University, Princeton, N. J.

OFFICERS AND MEMBERS

SMITH, ALEXANDER.....	<i>Columbia University, New York City.</i>
SMITH, EDGAR F.....	<i>University of Pennsylvania, Philadelphia, Pa.</i>
SMITH, ERWIN F.....	<i>Bureau of Plant Industry, Washington, D. C.</i>
SMITH, THEOBALD.....	<i>Princeton, N. J.</i>
STIEGLITZ, JULIUS.....	<i>University of Chicago, Chicago, Ill.</i>
STORY, WILLIAM E.....	<i>Clark University, Worcester, Mass.</i>
STRATTON, SAMUEL WESLEY.....	<i>Bureau of Standards, Washington, D. C.</i>
TAYLOR, DAVID WATSON.....	<i>Bureau of Construction and Repair, U. S. Navy, Washington, D. C.</i>
THAXTER, ROLAND.....	<i>Harvard University, Cambridge, Mass.</i>
THOMSON, ELIHU.....	<i>Swampscott, Mass.</i>
THORNDIKE, EDWARD LEE.....	<i>Columbia University, New York City.</i>
TRELEASE, WILLIAM.....	<i>University of Illinois, Urbana, Ill.</i>
TROWBRIDGE, JOHN.....	<i>Harvard University, Cambridge, Mass.</i>
ULRICH, EDWARD OSCAR.....	<i>U. S. Geological Survey, Washington, D. C.</i>
VAN VLECK, E.B.....	<i>University of Wisconsin, Madison, Wis.</i>
VAUGHAN, VICTOR CLARENCE.....	<i>University of Michigan, Ann Arbor, Mich.</i>
VERRILL, A. E.....	<i>53 Ralston St., Whitneyville, Conn.</i>
WALCOTT, CHARLES D.....	<i>Smithsonian Institution, Washington, D. C.</i>
WEBSTER, ARTHUR G.....	<i>Clark University, Worcester, Mass.</i>
WELCH, WILLIAM H.....	<i>807 St. Paul St., Baltimore, Md.</i>
WELLS, HORACE L.....	<i>Yale University, New Haven, Conn.</i>
WHEELER, WILLIAM M.....	<i>Harvard University, Cambridge, Mass.</i>
WHITE, DAVID.....	<i>U. S. Geological Survey, Washington, D. C.</i>
WHITE, HENRY SEELY.....	<i>Vassar College, Poughkeepsie, N. Y.</i>
WHITNEY, WILLIS RODNEY.....	<i>General Electric Co., Schenectady, N. Y.</i>
WILSON, EDMUND B.....	<i>Columbia University, New York City.</i>
WOOD, HORATIO C.....	<i>4107 Chester Ave., Philadelphia, Pa.</i>
WOOD, ROBERT W.....	<i>Johns Hopkins University, Baltimore, Md.</i>
WOODWARD, ROBERT S.....	<i>Carnegie Institution, Washington, D. C.</i>

SMITH, SIDNEY I..... *Yale University, New Haven, Conn.*

FOREIGN ASSOCIATES

ARRHENIUS, S. A.....	<i>Nobelinstitut, Stockholm.</i>
BARROIS, CHARLES.....	<i>Université, Lille.</i>
BRØGGER, W. C.....	<i>Universitet, Christiania.</i>
CROOKES, SIR WILLIAM.....	<i>London.</i>
DESLANDRES, HENRI.....	<i>Astrophysical Observatory, Meudon.</i>
DEWAR, SIR JAMES.....	<i>University, Cambridge.</i>
FISCHER, EMIL.....	<i>Chemisches Institut der Universität, Berlin.</i>
FORSYTH, A. R.....	<i>Imperial College of Science and Technology, London.</i>
GEKKE, SIR ARCHIBALD.....	<i>Haslemere, Surrey.</i>
GROTH, PAUL VON.....	<i>Universität, Munich.</i>
HEIM, ALBERT.....	<i>Zürich.</i>
HILBERT, DAVID.....	<i>Universität, Göttingen.</i>
KAPTEYN, JOHN C.....	<i>Rijks Universiteit, Groningen.</i>
KLEIN, FELIX.....	<i>Universität, Göttingen.</i>
KÖSSEL, ALBRECHT.....	<i>Heidelberg.</i>
KUSTNER, KARL FRIEDRICH.....	<i>Bonn.</i>
LANKESTER, SIR E. RAY.....	<i>South Kensington, London.</i>
LARMOR, SIR JOSEPH.....	<i>St. Johns College, Cambridge.</i>

LORENTZ, HENDRIK ANTON.....	<i>Rijks Universiteit, Leiden.</i>
OSTWALD, WILHELM.....	<i>Grossbothen, bei Leipsig</i>
PAVLOV, IVAN PETROVITCH.....	<i>Institute for Experimental Medicine, Petrograd.</i>
PENCK, ALBRECHT.....	<i>Universität, Berlin.</i>
PFEFFER, WILHELM.....	<i>Botanisches Institut der Universität, Leipzig.</i>
PICARD, CHARLES ÉMILE.....	<i>Université, Paris.</i>
RAYLEIGH, LORD.....	<i>University, Cambridge.</i>
RETZIUS, GUSTAV.....	<i>Högskolan, Stockholm.</i>
RUTHERFORD, SIR ERNEST.....	<i>University, Manchester.</i>
SCHUSTER, ARTHUR.....	<i>Secretary of the Royal Society, London.</i>
SEELIGER, HUGO RITTER VON.....	<i>Universität, Munich.</i>
THOMSON, SIR JOSEPH.....	<i>University, Cambridge.</i>
VOLTERRA, VITO.....	<i>Università, Rome.</i>
VRIES, HUGO DE.....	<i>Universiteit, Amsterdam.</i>
WAALS, JOHANNES D. VAN DER.....	<i>Amsterdam.</i>
WALDEYER, WILHELM.....	<i>Universität, Berlin.</i>
WOLF, MAX F. J. C.....	<i>Heidelberg.</i>
WUNDT, WILHELM.....	<i>Universität, Leipzig.</i>